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BOREOMYSIS OPARVA, A NEW POSSUM SHRIMP (CRUSTACEA: MYSIDACEA) FROM AN EASTERN TROPICAL PACIFIC SEAMOUNT

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Abstract.—*Boreomysis oparva* is described from near-bottom low oxygen waters surrounding an inactive seamount, Volcano 7. It is characterized by an upturned rostrum, large eyes without papillae, and a male pleopod 3 exopod with 3 spiniform setae on each of the last eight segments. It is abundant slightly below the seamount summit in near-bottom low oxygen water, but absent from water near the seamount base (with higher oxygen) and from low oxygen pelagic waters.

Volcano 7 is an inactive seamount 20 km in diameter in the eastern tropical Pacific at 13°23′N, 102°27′W. It arises from a depth of 3400 m to a summit at 730 m; the latter penetrates the pronounced oxygen-minimum zone of the region (Wishner et al. 1990, Levin et al. 1991). In November 1988 the plankton and benthos of Volcano 7 were sampled from shipboard on the R/V *Atlantis II* and from the submersible D.S.R.V. *Alvin*. The samples collected from the submersible contained more than 400 specimens of an undescribed species of the mysidacean genus *Boreomysis*, described and illustrated herein.

Methods

A multiple opening-closing 8-net system (183 μm mesh) mounted on the *Alvin* (Wishner & Gowing 1987) was used to collect zooplankton 1–3 m above the bottom during daytime dives. The 1-liter Plexiglas cod-end chambers were equipped with spring-loaded front and rear doors that were fixed open during the tow and were snapped shut at the end of the tow, making the chamber watertight. Simultaneously with the chamber closing a spring-loaded needle punctured a rubber balloon within the chamber, releasing its contents of glutaraldehyde and fixing the sample in situ. Plankton samples were also collected from shipboard with a 1 m^2 MOCNESS plankton net system (333 μm mesh) in vertically stratified tows to 1200 m depth.

Order Mysidacea Boas, 1883
Suborder Mysida Boas, 1883
Family Mysidae Dana, 1850
Subfamily Boreomysinae Holt & Tattersall, 1905
Genus *Boreomysis* G. O. Sars, 1869
Boreomysis oparva, new species
Figs. 1–20

Material.—See Table 1.

Types.—Holotype ♂, 22.5 mm, Dive 2145, Net 4, USNM 251923. Paratypes: Dive 2139, Net 8, 14 specimens, USNM 251918; Dive 2142, Net 8, 100 specimens, USNM 251919; Dive 2143, Net 4, 2 specimens, USNM 251920; Dive 2144, Net 8, 4 specimens, USNM 251921; Dive 2145, Net 4, 6 specimens, USNM 251922.

Etymology.—From "o," the chemical symbol for oxygen, plus the Latin "parvus" (little, slight), referring to the occurrence of this mysid in low-oxygen water.

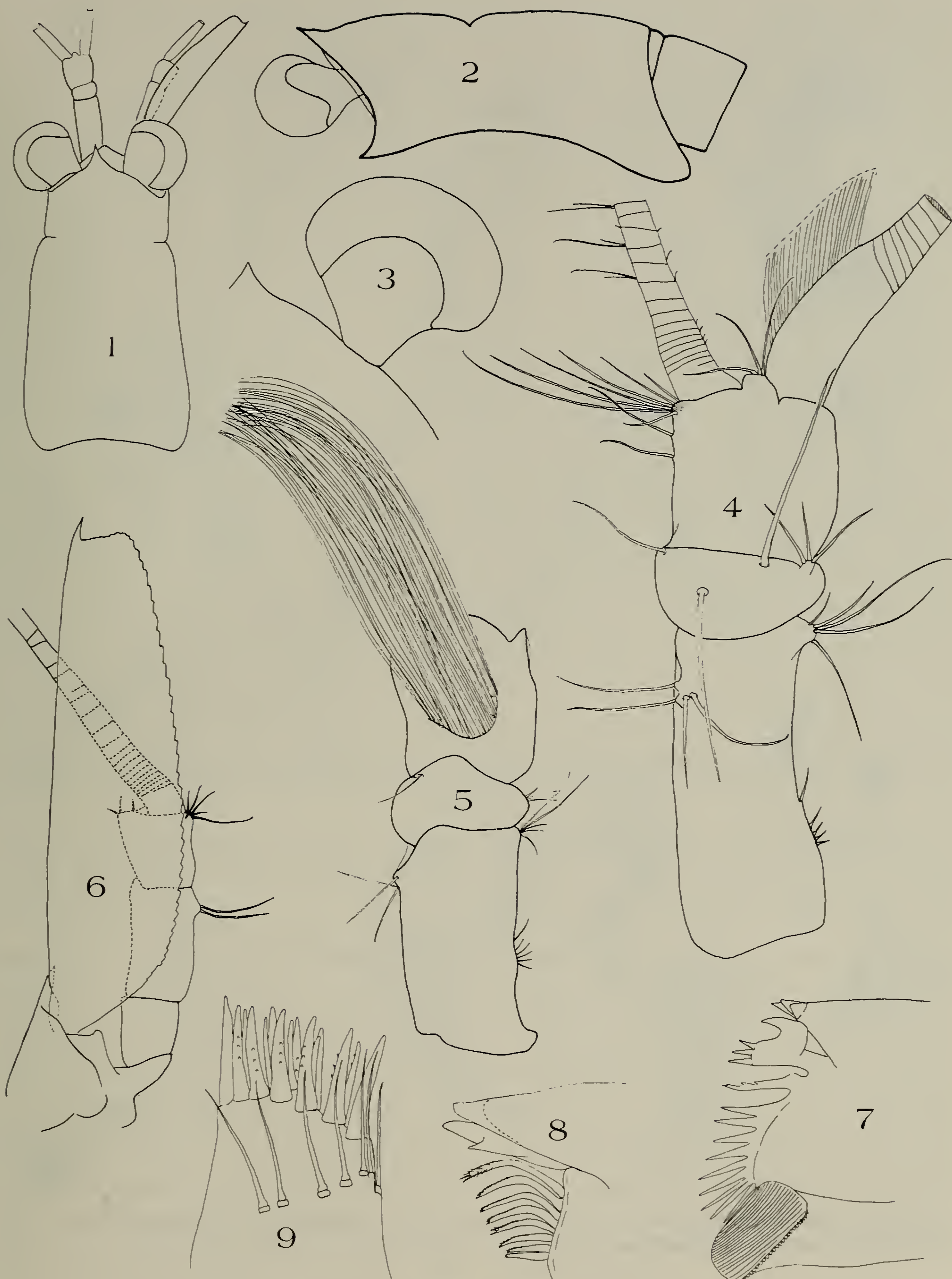
Description.—Length up to about 25 mm. Anterior margin of carapace slightly convex. Rostrum acute, reaching ⅓ to ½ length of 1st segment of antenna 1, directed dorsally at angle of about 45° to lateral axis of

Table 1.—*Boreomysis oparva* collected from Volcano 7 by the submersible D.S.R.V. *Alvin* in November 1988. Collections marked with an asterisk are deposited in the National Museum of Natural History, Smithsonian Institution.

Dive-Net	♂	♀	Juv.	Maximum length (mm)	Mid-depth (m)	Location
2139-1	—	—	7	18.0	790	summit
4	1	2	1	26.5	852	summit
5	1	7	2	22.5	790	summit
6	2	4	—	21.2	810	summit
8*	5	8	1	25.4	852	summit
2140-1	2	2	—	19.8	804	summit
2	—	4	—	20.0	793	summit
3	8	4	3	23.0	815	summit
4	1	2	—	18.8	874	summit
5	1	4	—	21.5	804	summit
6	—	3	4	18.3	793	summit
7	4	7	7	23.9	817	summit
8	1	12	13	18.7	876	summit
2142-1	3	4	3	23.0	797	summit
2	1	4	—	21.4	782	summit
3	10	17	4	23.4	788	summit
4	26	72	116	25.0	797	summit
5	6	8	6	22.2	797	summit
7	6	18	6	22.5	788	summit
8*	9	56	35	21.5	808	summit
2143-2	2	1	1	22.1	1300	flank
3	—	3	3	—	1297	flank
4*	—	1	1	—	1308	flank
5	—	3	2	20.2	1300	flank
8	3	6	6	22.0	1309	flank
2144-1	—	1	—	—	1289	flank
3	—	1	1	14.3	1179	flank
4	1	1	—	—	1250	flank
7	1	—	—	20.8	1195	flank
8*	—	1	3	17.5	1259	flank
2145-3	—	—	2	9.6	1323	flank
4*	2	4	1	22.5	1352	flank
8	1	1	—	20.3	1304	flank

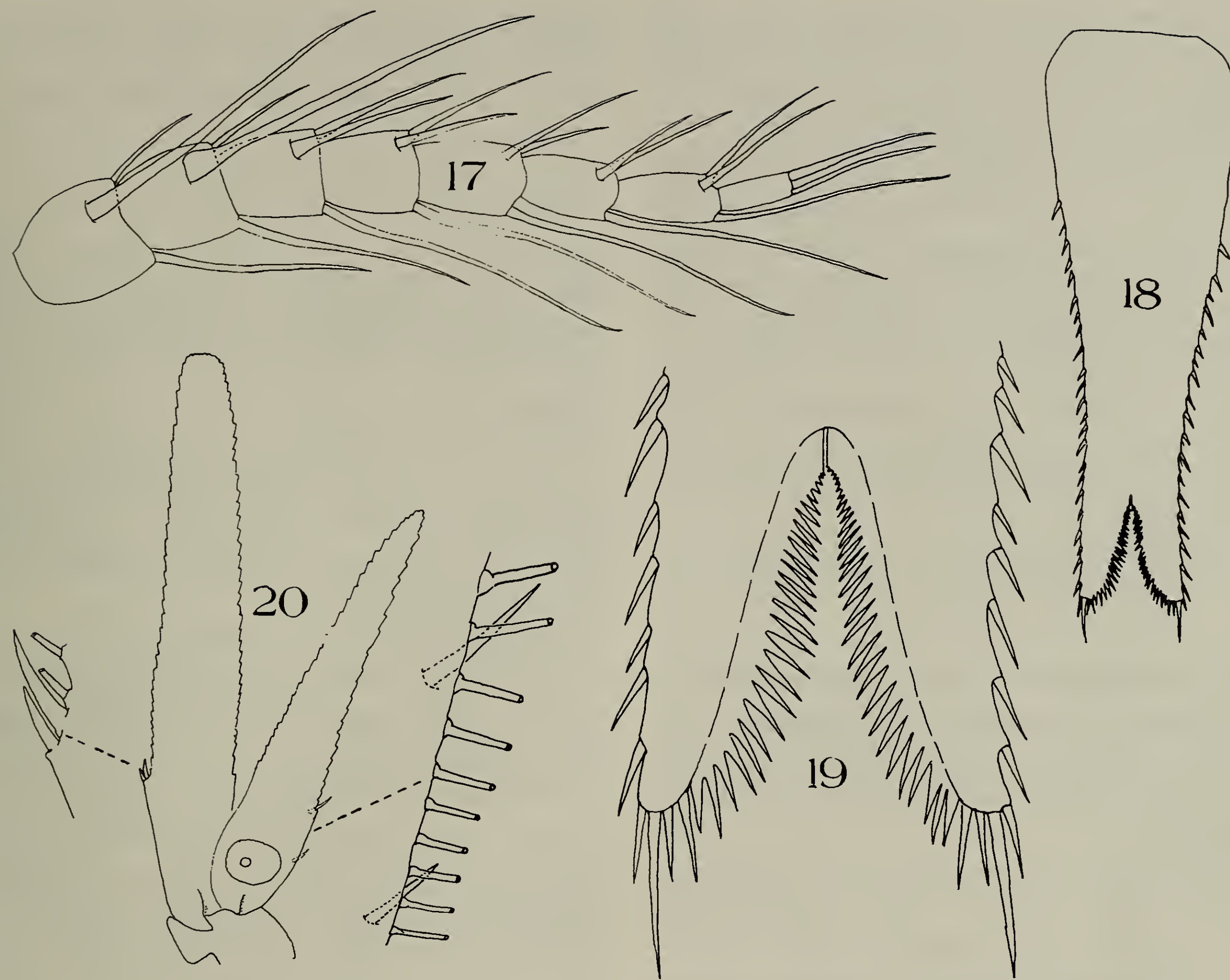
carapace. Anteroventral corner of carapace acute; cervical groove well developed. Carapace covering laterally 1st segment of exopods of thoracopods and posteriorly about ½ of pleonite 1. Eye with rather short, narrow stalk and broad cornea, reaching well beyond midlength of 1st segment of antenna 1, without ocular papilla.

Antenna 1, 1st segment of peduncle narrower than 2nd and 3rd segments, nearly 3× as long as wide, with medial papilla at distal ⅙ bearing 4 setae and distolateral papilla with 5 setae. 2nd segment short, with 2 long dorsal setae, shorter seta on distomedial corner, and 3 setae on distolateral papilla. 3rd segment slightly more than ½ length of 1st segment, with cluster of 7 setae at distomedial corner and 3 setae on quadrate process at midwith of distal margin. ♂ antennular brush very dense and long; if present, ♂ lobe obscured by setae of brush. 1st segment of lateral flagellum densely



Figs. 1–9. *Boreomysis oparva.* 1, Head and thorax, dorsal; 2, Same, lateral; 3, Eye and rostrom, dorsal; 4, Antenna, 1, ♀, dorsal; 5, Peduncle of ♂ antenna 1, ventral; 6, Antenna 2, dorsal; 7, Right mandible, gnathal surface; 8, Left mandible, same, but molar omitted; 9, Maxilla 1, outer ramus.

Figs. 10–16. *Boreomysis oparva.* 10, Apex of mandibular palp; 11, Maxilla 2; 12, Endites of maxilla 1, 1st endite (below) enlarged; 13, Maxilliped; 14, Thoracopod 2; 15, Thoracopod 5; 16, Penis, lateral.



Figs. 17–20. *Boreomysis oparva.* 17, Exopod of ♂ pleopod 3, distal segments; 18, Telson, dorsal; 19, Apex of telson, dorsal; 20, Right uropod, dorsal, with enlarged detail of spines of exopod and endopod.

armed with setae about as long as 1st segment of peduncle; only proximal parts of setae shown in Fig. 4.

Antenna 2 peduncle not quite reaching midlength of scale; segment 1 produced distolaterally into spiniform process. Scale nearly 4 × as long as broad; terminal spine reaching beyond nearly truncate apex, which slants laterally at about 15° to axis of scale.

Left mandible with bicuspid incisor and lacinia; spine-row of 8 spines. Right mandible with tricuspid incisor; lacinia dichotomous, dorsal ramus a curved pointed tooth, ventral ramus quadrate, bearing 3 spines; spine-row formed of a single serrate spine separated by gap from 9 simple spines with common base. Palp 2nd segment broad proximally, narrowing distally, with scattered marginal setae; 3rd segment about 0.7 length of 2nd segment, distal half with close-set plumose marginal setae and 2 long apical setae.

Maxilla 1 outer ramus with 7 setae on surface and 15 apical spines.

Maxilla 2 protopod margin with dense covering of fine setae interspersed with 9 shorter and stouter setae. 1st endite with 16, lobes of 2nd endite with 12 and 15 apical setae respectively. Endopod segments subequal in length; 1st segment with 9 setae on medial margin; 2nd segment with about 30 marginal setae. Exopod reaching slightly beyond 1st endopod segment, with about 33 marginal setae.

Maxilliped (endopod of thoracopod 1) endite of basis reaching distal margin of merus. Carpus nearly as long as propus and dactyl (excluding nail) combined. Medial margin of all segments densely setose.

Endopods of thoracopods 2–8 with propus divided by incomplete suture. Dactyl of thoracopod 2 without nail. Anterior margin of propus of thoracopods 3–8 with 3 clusters of 5–7 setae in which 1 seta is much longer than others. Exopods of thoracopods with 17–20 segments.

Penis about as long as basiopod of thoracopod 8, widening distally; posterior margin with right-angled bend proximal to rounded setose apex.

3rd ♂ pleopod with 18 segmented endopod and longer 23 segmented exopod. On exopod paired plumose setae of proximal segments replaced on last 8 segments by 3 simple spiniform setae on each segment, except 2 such setae on apical segment; 2 of the 3 setae at distomedial corner, 1 at distolateral corner.

Telson slightly more than 3× as long as width at base, slightly longer than pleonite 6, posterior half with slightly concave margins. Apical cleft about ⅙ length of telson, each side with about 30 teeth, margins gradually diverging posteriorly; base not dilated but with narrow slit. Each lobe of apex armed with long spine flanked laterally by 1 spine and medially by 2 spines; flanking spines half length of long spine. Lateral margins of telson each armed with 20–23 spines, some shorter than others but not arranged in regular pattern.

Endopod of uropod slightly longer than telson, with 2 spines (0–1 in immatures) inserted ventrally near medial margin adjacent to statocyst. Exopod ¼ longer than endopod, lateral margin naked for proximal ²⁄₇, 2 spines on outer margin at distal end of naked part.

Comparisons. —Nearly 40 species of *Boreomysis* are recognized currently, but it is uncertain how many of them will prove eventually to be valid. Some are based only on females or immature males, hence the structure of the mature male exopod of pleopod 3, a character of high taxonomic value, is unknown. The condition in *B. oparva,* the 8 distal segments each with 3 simple setae, is at present unique; other species in which this pleopod has been described have 2 such setae. This feature, combined with the upturned rostrum, the large eyes lacking papillae, and the 2 spines on both the endopod and exopod of the uropod, readily distinguish *B. oparva* from similar species.

Birstein & Tchindonova (1958) key out 27 species and 2 varieties of *Boreomysis,* and Ii (1964) gives a key to the 10 species and 2 varieties that he recognized from the northwestern Pacific.

Ecology. —The summit of Volcano 7 (730 m) lies in the oxygen minimum zone (Wishner et al. 1990), and *B. oparva* was not found there. Slightly deeper at the lower summit (ca. 790 m), associated with the increase in oxygen concentration from 0.08 to 0.88 ml/liter (Levin et al. 1991), *B. oparva* became abundant, reaching a maximum of 114/m³. At the flank of the seamount (1185–1310 m) *B. oparva* was less abundant and absent from most of the samples. It was absent from near-bottom waters at the base of the seamount (3400 m) and from pelagic waters (0–1200 m) surrounding the seamount. The abundance peak at the lower summit was similar to that found for many infaunal taxa (Levin et al. 1991).

Food. —Gowing & Wishner (1992) found dense numbers of gram-positive bacteria-like bodies in the guts of some specimens of this mysid, suggesting that they opportunistically consume bacterial aggregates or mats at the lower boundary of the oxygen minimum zone.

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